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IS 2308 : 1989

( Reaffirmed 2004 )

# *Indian Standard*

# TEST CHART FOR SLOTTING MACHINES

## *( First Revision )*

# भारतीय मानक

# खांच काटने की मशीनों का पुनरीक्षण चार्ट

## ( पहला पुनरीक्षण )

UDC 621·913·2/·3 : 620·1 ( 084·3 )

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**BUREAU OF INDIAN STANDARDS**
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*September* 1990

**Price Group 4**

Machine Tool Basics and Modular Units Sectional Committee, PED 03

## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards on 1 August 1989, after the draft finalized by the Machine Tool Basics and Modular Units Sectional Committee had been approved by the Production Engineering Division Council.

This standard was first published in 1963. In order to align it with the existing format of test chart standards and to include the reference of IS 2063 : 1962 'Code for testing machine tools', with test methods, this revision has been taken up.

# *Indian Standard*
# TEST CHART FOR SLOTTING MACHINES
## *( First Revision )*

## 1 SCOPE

**1.1** This standard prescribes both geometrical and practical tests on slotting machines and the corresponding deviations with reference to IS 2063 : 1962 'Code for testing of machine tools'.

**1.2** It deals with only the verification of accuracies and applies neither to the testing of the running of the machine ( vibrations, abnormal noises, stick slip motion of components, etc ) nor to the machine specifications ( speeds/feeds, etc ).

## 2 REFERENCE

| *IS No.* | *Title* |
|---|---|
| 2063 : 1962 | Code for testing of machine tools |

## 3 PRELIMINARY REMARKS

**3.1** To apply these tests, reference shall be made to IS 2063 : 1962 especially for installation of the machine before testing, warming to spindles and other parts, description of measuring methods and recommended accuracy of testing instruments and equipments.

**3.2** The sequence in which the geometrical tests are given is related to unit and other subassemblies of the machine and does not specify the order in which the tests are to be carried out.

The sequence of carrying out the tests may be changed to suit ease of mounting of measuring and testing equipments.

**3.3** It is necessary while inspecting the machine to carry out all the tests described in this standard; excepting those tests which may be omitted in mutual agreement between the buyer and the manufacturer.

**3.4** Practical tests shall be carried out only with finishing cuts and not with roughing cuts which are liable to generate appreciable cutting forces. The details of test pieces, cutting and test conditions shall be specified by the manufacturer.

**3.5** When establishing the tolerance for a measuring range different from that indicated in this standard ( *see* **2.3.1.1** of IS 2063 ), it shall be taken into consideration that minimum tolerance is 0·01 mm. For any proportional value the calculated value shall be rounded off to the nearest 0·005 mm. However, the least count of measuring instruments need not be finer than 0·01 mm.

**3.6** Whenever alternate methods of testing are suggested in this standard, the choice of actual method of testing is left to the manufacturer.

**3.7** For the purpose of this standard, various methods of expressing permissible deviation are used and each is having a particular type of application. Following methods are employed.

**3.7.1** 000/000 for deviations of perpendicularity which are ratios.

**3.7.2** 000 for any length of 000 for deviations of straightness and parallelism, the expression is used for local permissible deviations, the measuring length being obligatory.

**3.7.3** 000 for 000 for deviations of straightness and parallelism, this expression is used to recommend a measuring length, but in this case the proportionality rule comes into operation. if the measuring length differs from those indicated.

## 4 TESTING INSTRUMENTS

**4.1** The testing instruments shall be of approved type and shall be calibrated at a recognised temperature; conforming to relevant Indian Standards.

## 5 ACCURACY REQUIREMENT

**5.1** The tests to be carried out, the maximum permissible errors, the instruments required and the manner in which the tests are to be carried out shall be as detailed in the test chart.

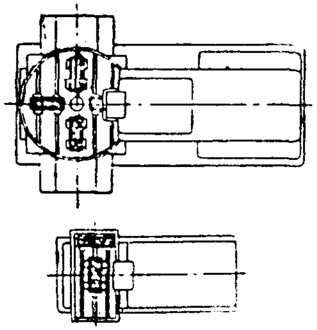
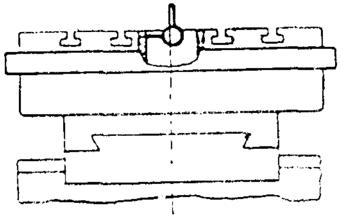
NOTE — The illustrative diagrams in this standard are only for reference.

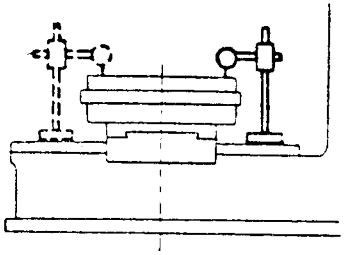
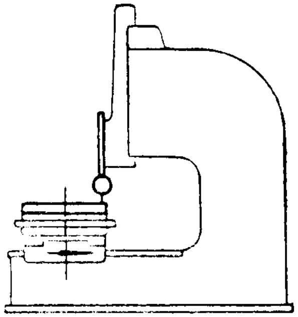
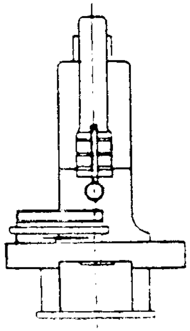
## TEST CHART FOR SLOTTING MACHINES

Type
Order No.
Customer
Machine No.
Date
Inspector

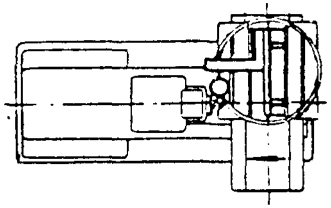
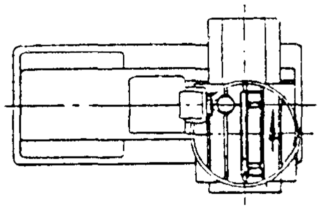
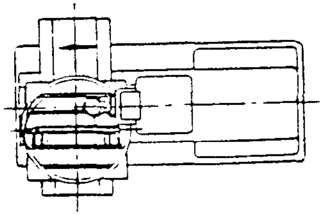
## GEOMETRICAL TESTS

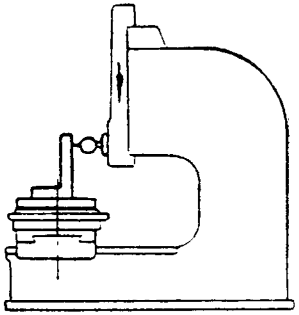
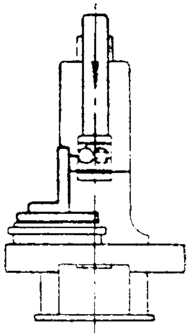
All dimensions in millimetres.

| Sl No. | Figure | Object | Measuring Instruments | Reference to IS 2063 and/or Instructions for Testing | Permissible Deviations | Actual Error |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 |  | Measurement of the flatness of table top face | Spirit level, gauge blocks | **5.2.2.2** and **5.2.2.3.** The table shall be in the central position. Place spirit level on the table over gauge blocks in two mutually perpendicular directions and the readings shall be noted. | 0·06 for 1 000<br>Table surface shall be concave | |
| 2 |  | Measurement of runout of central locating bore | Dial gauge | **5.5.1.2**(b). The table shall be in the central position. Mount the dial guage on the ram. Rotate table slowly by hand and note the readings.<br>NOTE — In case of taper bores, use testing mandrel ( *Max* length 75 mm ) and reading shall be taken near the taper nose. | 0·03 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 |  | Measurement of camming of table top surface | Dial gauge with magnetic stand | **5.5.1.1**(d)<br>i) Table shall be in the central position. Mount dial gauge on the bed guideways. Rotate the table slowly and note the readings.<br>ii) Repeat the procedure at diametrically opposite position and note the readings. The average of the two readings shall be the measured value. | 0·03 for 300 (dia of table) | |
| 4 | a)  | a) Measurement of parallelism of table surface to its movement in longitudinal direction | Straight edge and dial gauge | **5.3, 5.3.1.2**(b)<br>Set straight edge parallel to the direction of movement on table top. Mount dial gauge on ram and move the table. Note the readings of dial gauge. | i) For $d \leqslant 1\,600$<br>0·02 on 300<br>*Max* 0·05<br>ii) $d > 1\,600$<br>0·03 on 300<br>*Max* 0·08<br>( '*d*' diameter of table ) | |
| | b)  | b) Measurement of parallelism of table surface to its movement in transverse direction | Straight edge and dial gauge | **5.3, 5.3.1.2**(b)<br>Set straight edge in the direction of transverse movement. Mount dial gauge on the ram.<br>Move the table in the transverse direction and note the readings on dial guage. | i) For $d \leqslant 1\,600$<br>0·02 on 300<br>*Max* 0 05<br>ii) $d > 1\,600$<br>0·03 on 300<br>*Max* 0·08<br>( '*d*' diameter of table ) | |

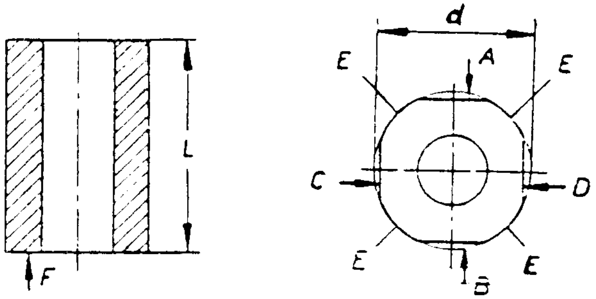
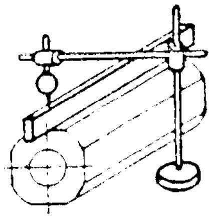
TEST CHART FOR SLOTTING MACHINES ( *Continued* )

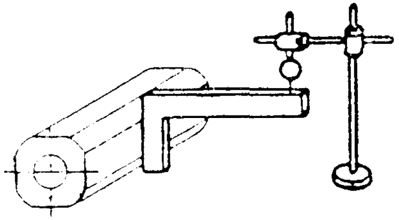
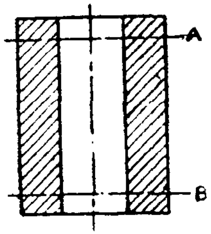
| Sl No. | Figure | Object | Measuring Instruments | Reference to IS 2063 and/or Instructions for Testing | Permissible Deviations | Actual Error |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 5 |  | Measurement of parallelism of the reference '*T*' slot to the transverse movement of the table.<br>NOTE — For machines without setting by index mark | Dial gauge | **5.3.2.2** and **5.3.2.2**(a-1)<br>Set the dial gauge on the ram. Move the table in the transverse direction and note the dial gauge readings. | i) For $d \leqslant$ 1 600<br>0·02 on 300<br>*Max* 0·05<br>ii) $d >$ 1 600<br>0·03 on 300<br>*Max* 0·08<br>('*d*' diameter of table) | |
| 6 |  | Measurement of squareness of the longitudinal and transverse movements of table | Dial gauge; square and straight edge | **5.4.1** and **5.4.1.1**(b-1)<br>Set the straight edge parallel in the transverse direction, set the square with respect to straight edge. Mount the dial gauge on ram. Engage feeler on square and move the table in longitudinal direction and note readings. | i) For $d \leqslant$ 1 600<br>0·02 on 300<br>*Max* 0·05<br>ii) $d > \phi$ 1 600<br>0·03 on 300<br>*Max* 0·08<br>('*d*' diameter of table) | |
| 7 |  | Measurement of parallelism of reference '*T*' slot to the longitudinal movement of table. (After 90° indexing for machines with indexing table.) | Dial gauge | **5.3.2.2** and **5.3.2.2**(a-1)<br>Set dial gauge on the ram. Move the table in the longitudinal direction and note dial gauge readings. | i) For $d \leqslant$ 1 600<br>0·02 on 300<br>*Max* 0·05<br>ii) $d > \phi$ 1 600<br>0·03 on 300<br>*Max* 0·08<br>('*d*' diameter of table) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 8 | a)  | a) Measurement of the squareness of ram movement to the table surface in longitudinal direction | Straight edge square and dial gauge | **5.4.1** and **5.4.1.1**(b-1)<br>Set square on straight edge set in longitudinal direction.<br>Mount dial gauge on the ram. Move the ram with respect to square and note dial gauge measurement. | 0·03 on 300<br>Ram shall be inclined towards column-downwards only | |
| | b)  | b) Measurement of the squareness of ram movement to the table surface in the transverse direction | Straight edge square and dial guage | **5.4.1** and **5.4.1.1** (b-1)<br>Set square on straightedge set in transverse direction.<br>Mount the dial gauge on the ram. Move the ram with respect to square and note dial gauge measurement. | 1) 0·02 per 300<br>2) 0·05 *Max* | |

## TEST CHART FOR SLOTTING MACHINES

### PRACTICAL TEST

| Sl No. | Figure | Object | Measuring Instruments | Reference to IS 2063 and/or Instructions for Testing | Permissible Deviations | Actual Error |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 1 | NOTES<br>i) Work piece locating face *F* shall be correctly machined and shall be flat.<br>ii) Work piece shall be mounted in the centre of the table. Faces *A* and *D* shall be machined by using longitudinal and transverse movements respectively.<br>iii) Index table though 180° and repeat operation for faces *B* and *C*.<br>iv) If required machine face *E*, before faces *A*, *B*, *C* and *D* by using rotary feed.<br>a)<br><br> <br>$L \approx \frac{2}{3}$ stroke<br>$d \approx \frac{1}{2}$ stroke<br> | a) Measurement of parallelism of faces *A* and *B*, C and *D* | a) Straight edge dial gauge with stand | a) **5.3.1, 5.3.1.2**(b)<br>Mount the work piece on surface plate, located on one of the machined faces. Set straight edge on the top face, mount dial gauge on the surface plate and note the dial gauge readings in longitudinal and cross directions (minimum 2 positions). Repeat the procedure for other faces. | a) For $l \leqslant 400$<br>0·04 per 300<br>$400 < l \leqslant 630$<br>0·06 per 300,<br>$l > 630$<br>0·08 per 300<br>(*l Max* stroke length) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | b)  | b) Measurement of squareness of faces *A*, *B*, *C* and *D* to each other and face *F* | b) Dial gauge with magnetic stand, square and surface plate | b) **5.4.1, 5.4.1.1**<br>i) Set the work piece on machined face. Set the square in contact with machined surface (short side square in contact). Mount dial gauge on surface plate and move the dial gauge on the longer side of square and note the readings. Repeat the procedure for all machined faces.<br>ii) Set the work piece on face 'F' locating face and repeat above procedure for all 4 faces. | b) For $l \leqslant 400$<br>0·03 per 300<br>$400 < l \leqslant 630$<br>0·05 per 300<br>$l > 630$<br>0·06 per 300<br>( *l Max* stroke length ) | |
| | c)  | c) Measurement of roundness of cylindrical area *E* | c) Dial gauge with magnetic stand and surface plate | c) **5.3.4, 5.3.4.2**(a)<br>Mount the dial gauge on surface plate and measure the roundness of work piece at two positions — *A* and *B* which shall be closer to the end faces. ( *Max* distance between *A* and *B* shall be 300 mm ) | c) For $l \leqslant 400$<br>0·04 per 300<br>$400 < l \leqslant 630$<br>0·06 per 300<br>$l > 630$<br>0·08 per 300<br>( *l Max* stroke length ) | |

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**Headquarters :**

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
( Common to all Offices )

| Regional Offices : | Telephone |
|---|---|
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| Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola<br>CALCUTTA 700054 | 37 86 62 |
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